

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

ALBIHN-411

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/868214

INTERNATIONAL APPLICATION NO. PCT/SE99/02405	INTERNATIONAL FILING DATES 17 December 1999	PRIORITY DATE CLAIMED 17 December 1998
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TITLE OF INVENTION AN INSTRUMENT AND A METHOD FOR MEASURING THE DEGREE OF  
DUST AND DIRT ON A SURFACE

APPLICANT(S)  
FOR DO/EO/US Ari KOUVONEN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371 (f)).
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
  - a. ☐ is attached hereto (required only if not transmitted by the International Bureau).
  - b. ☒ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). (Unexecuted)
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

**Items 11. to 16. below concern document(s) or information included:**

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. w/PTO-1449, 6 references
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 & 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

Copy of International Application as published  
Copy of International Preliminary Examination Report  
Three (3) Sheets Formal Drawings

**EXPRESS MAIL LABEL NO. EL804524359US**

**DATE: June 14, 2001**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">097/868214</div>	INTERNATIONAL APPLICATION NO. PCT/SE99/02405	ATTORNEY'S DOCKET NUMBER ALB/IN-411
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17. <input checked="" type="checkbox"/> The following fees are submitted:  <div style="border: 1px solid black; padding: 5px;"> <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) – (5)):</b>  <input checked="" type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$1,000.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$860.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$710.00  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$690.00  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00         </div>	<div style="border: 1px solid black; padding: 5px;"> <b>CALCULATIONS</b>    PTO USE ONLY         </div>
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<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>	1,000.00
Surcharge of <u>\$130.00</u> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	20 - 20 =		x \$18.00	
Independent claims	3 - 3		x \$80.00	
MULTIPLE DEPENDENT CLAIM(s) (if applicable)			+ \$270.00	270.00
<b>TOTAL OF ABOVE CALCULATIONS =</b>				1,270.00
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				635.00
<b>SUBTOTAL =</b>				635.00
Processing fee of <u>\$130.00</u> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).    +				
<b>TOTAL NATIONAL FEE =</b>				635.00
Fee for recording the enclosed assignment (37 CFR 1.21 (h)). Assignment must be accompanied by appropriate cover sheet (37 CFR 3.28, 3.31) ( \$40.00 per property).    +				
<b>TOTAL FEES ENCLOSED =</b>				635.00

	<b>Amount to be:</b> <b>Refunded</b>  <b>Charged</b>
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a. ☐ A check in the amount of \_\_\_\_\_ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 12-1095 in the amount of \$ 635.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required or credit any overpayment to my Deposit Account No. 12-1095. A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

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 Name  
**25,428**  
 Registration Number

3/11/15

- 5     An instrument and a method for measuring the degree  
     of dust and dirt on a surface

TECHNICAL FIELD:

- 10     The present invention relates to a measurement instrument and a method  
     for measuring the degree of covering of dust and dirt on a surface,  
     preferably for the purpose of monitoring cleaning quality after cleaning.

BACKGROUND TO THE INVENTION:

- 15     Monitoring of cleaning quality, that is to say the result achieved after  
     cleaning, has traditionally been done by visual assessment of the degree of  
     covering of dust and dirt on surfaces in the premises where the monitoring  
     is carried out. A disadvantage of this visual method is that the result is  
20     necessarily subjective, which can easily lead to disputes between the party  
     which carried out the cleaning and the party which purchased the cleaning  
     services if the quality of the cleaning is called into question. In addition, the  
     visual method does not provide a basis for objective statistical evaluation of  
     cleaning quality, which is sought in especially demanding environments  
25     such as schools, day nurseries and hospitals. In environments such as  
     these, stringent demands are generally placed on cleaning, among other  
     reasons in order to reduce the risk of dust allergy.

- 30     Work is at present being done at European level in an attempt to draw up a  
     standard for evaluating the result of cleaning. An objective measurement  
     method can also be used, for example, for drawing comparisons between  
     different cleaning methods. A method is at present available on the market  
     which permits such objective measurements. The known method uses a  
     measurement instrument specially built for the purpose, in which a laser  
35     beam passes through a transparent test film with a certain covering of dust,  
     the light transmission of the film being measured by means of a  
     photodetector, on the opposite side of the test film from the laser beam  
     source, registering the intensity of the light which has passed through the  
     test film. However, the measurement instrument must first have been  
     calibrated by light being passed through the test film in the dust-free state.

- 2 -

The degree of covering of dust and dirt is then indicated as a function of the difference between the registered light intensity on passing light through the dust-free test film and the slightly lower light intensity which is registered on passing light through the dust-covered test film.

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The test film used in the known method is of the same type used, for example, by police authorities when taking finger prints. The film is coated with an adhesive layer which, prior to the film being used, is protected by a protective film. Upon use, the protective film is removed and the test film is

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applied with a predetermined pressure against the surface whose covering of dust and dirt is to be measured, with any dust and dirt particles from the surface attaching themselves to the adhesive layer. The film is then placed in a holder in the measurement instrument and light is passed through it in accordance with the above.

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However, a disadvantage of the known measurement instrument is that, because of the advanced laser technology used, it is too expensive to be purchased by small or medium-sized cleaning companies, or by the actual party paying for the cleaning services. In addition, the weight and external dimensions of the measurement instrument are such that it is rather impractical for frequent use. A further disadvantage of the known measurement instrument is that, for each measurement, it has to be calibrated with respect to the individual test film, which means that the film has to be placed twice in the measurement instrument for each point of

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measurement in the premises which have been cleaned. These features of the measurement instrument, taken together, have led to a situation where at the present time only a small number of specially trained and therefore expensive consultants carry out monitoring of cleaning quality.

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## 30 DESCRIPTION OF THE INVENTION:

Against this background, the inventor has identified a need among smaller and medium-sized cleaning companies, and among cleaning contractors such as schools and hospitals, for them to be able to carry out cleaning

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quality measurements themselves in a simple and inexpensive manner using a measurement instrument which is especially suited for this purpose. The present invention therefore makes available a measurement instrument for measuring the degree of covering of dust and dirt on a surface, for example in order to monitor cleaning quality, comprising a

- 3 -

holder by means of which a measurement object in the form of a test film is held, during measurement, in a plane in a measurement zone defined by the measurement instrument, the said test film being coated with an adhesive layer which, during testing of the surface, is intended to pick up  
5 any dust and dirt particles from the said surface. The measurement instrument according to the invention is characterized in particular by:

- a light source intended to illuminate the adhesive layer of the test film with obliquely incident light;

- a photodetector intended to register the light intensity of the light reflected from the test film; and

- a processor (14) intended to present a measurement value which represents the degree of covering of dust and dirt on the surface (30), the said measurement value being based on the light intensity registered by the photodetector (8).

The invention also relates to a method for measuring the degree of covering of dust and dirt on a surface, for example in order to monitor cleaning quality, comprising the following stages:

- in a first stage, a test film coated with an adhesive layer is applied with a predetermined pressure against the surface whose degree of covering of dust and dirt is to be measured, with any dust and dirt particles from the said surface attaching themselves to the adhesive layer;

- the test film is then removed from the said surface and is placed in a holder which, at least during measurement, holds the test film in a plane in a measurement zone defined by the measurement instrument,

- a light source illuminates the adhesive layer of the test film with obliquely incident light;

- a photodetector registers the light intensity of the light reflected from the test film; and

- a processor (14) presents a measurement value which represents the degree of covering of dust and dirt on the surface (30), the said

- 4 -

measurement value being based on the light intensity registered by the photodetector (8).

5 In an advantageous embodiment of the invention, a gloss meter, of the type which measures light reflected from a surface, is used as a measurement instrument for measuring the degree of covering of dust and dirt on a surface, for example in order to monitor cleaning quality, together with a test film coated with an adhesive layer.

10 Other features and advantages of the invention will become evident from the following description of a preferred embodiment.

#### BRIEF DESCRIPTION OF THE DRAWINGS:

15 The invention will be described in greater detail below on the basis of a preferred embodiment and with reference to the attached drawings, in which:

20 Fig. 1 shows a diagrammatic view of a measurement instrument according to the prior art;

Fig. 2 shows a diagrammatic view of a measurement instrument according to the invention;

25 Fig. 3 shows an enlarged perspective view of a test film according to the invention;

Fig. 4 shows how the test film is pressed against the surface whose degree of covering of dust and dirt is to be measured; and

30 Fig. 5 shows a perspective view of a measurement instrument according to a preferred embodiment of the invention, where the test film has been placed in the holder prior to measurement.

#### 35 DESCRIPTION OF A PREFERRED EMBODIMENT:

In order to illustrate the main differences between the prior art and the invention, a measurement instrument (A) according to the prior art is first shown in Fig. 1. The measurement instrument (A) is here accommodated

- 5 -

- in an oblong casing (B) which is provided with an opening (C) for introduction of a test film (D). In brief, the instrument works by means of a laser beam generated from a laser beam source (E) passing through a transparent test film (D) with a certain covering of dust, the light transmission of the film being measured by means of a photodetector (F), on the opposite side of the test film (D) from the laser beam source (E), registering the intensity of the light which has passed through the test film (D). However, the measurement instrument (A) will first have to have been calibrated by light being passed through the test film (D) in the dust-free state. The degree of covering of dust and dirt is then indicated as a function of the difference between the registered light intensity when light is passed through the dust-free test film (D) and the slightly lower light intensity which is registered when light is passed through the dust-covered test film (D).
- Fig. 2 shows a diagrammatic outline view of a measurement instrument 1 according to a preferred embodiment of the invention. The measurement instrument is designated in general by reference number 1 and is accommodated in a casing 2. The casing 2 is preferably made of a light-weight material such as plastic or aluminium, since the measurement instrument 1 is dimensioned such that it can be held in one hand by a user. The measurement instrument 1 is further provided with a holder 2 by means of which a measurement object in the form of a test film 3 is maintained in a plane in a measurement zone 4 defined by the measurement instrument 1. By means of longitudinal rails 16, which run on tracks 17, the holder 2 can be moved relative to the rest of the measurement instrument 1, and it can be pushed between a first, open position as shown in Fig. 5 and a second, closed position as shown in Fig. 2.
- The holder 2 is further provided with securing members 10 for securing a test film 3 without tensioning. In the example shown in Fig. 2 and Fig. 5, the securing members 10 consist of tongue elements connected to the holder 2 by means of rivets 11. The securing members 10 can of course be formed in another way. It is important for the test film 3 to be secured without tensioning such that it lies flat in the holder 2 without bending, which bends would otherwise have an adverse effect on the measurement result. In an alternative embodiment (not shown), the holder 2 is arranged so that it can be detached from the rest of the measurement instrument 1. Where maximum measurement accuracy is required, the measurement instrument

- 6 -

1 can be calibrated by means of a dust-free and dirt-free test film 3 being placed in the holder 2, with measurement taking place after a calibration button 20 has been depressed. In this way, the instrument is calibrated exactly to the test film which is being used in the subsequent test and measurement, as a result of which the greatest accuracy of measurement is achieved. However, calibration does not necessarily have to take place before measurement, since a corresponding calibration measurement value related to an average test film is stored in a processor 14 in the measurement instrument 1, with the processor 14 using this stored calibration measurement value when no calibration is carried out before the actual measurement.

The test film 3, which is shown enlarged in Fig. 3, is of the same type as is used, for example, by police authorities when taking finger prints. The film 3 is coated with an adhesive layer 5 which, before the film 3 is used, is protected under a protective film 13.

Fig. 4 shows how the test film 3 is used for testing a surface 30. The protective film 13 is removed and the test film 3 is applied with a predetermined pressure – preferably by means of a roller 32 specially designed for the purpose and available on the market – against the surface 30 whose degree of covering with dust and dirt is to be measured. Any dust and dirt particles 31 from the surface 30 attach themselves to the adhesive layer 5. The test film 3 is then placed in the holder 2 of the measurement instrument 1 with the adhesive layer 5 facing upwards, as can be seen in Fig. 5, and the holder 2 is pushed in to its closed position (not shown) in the direction of arrow 18 and the measurement is carried out.

Referring again to Fig. 2, the measurement instrument 1 will now be described in detail. Thus, the instrument 1 comprises a light source 6 intended to illuminate the adhesive layer 5 of the test film 3 with obliquely incident light, which test film is placed in the holder 2 during measurement in such a way that its adhesive layer 5 is directed towards the light source 6. The light source 6 is more precisely intended to illuminate the adhesive layer 5 of the test film 3 at an angle of incidence  $\alpha$  of between 20 and 80 degrees, preferably 60 degrees. In the example shown in Fig. 2, the angle of incidence  $\alpha = 60$  degrees.



- 7 -

An optical lens 7 is placed between the light source 6 and the measurement zone 4, which lens 7 is designed to parallelize the light beams 12 impacting the test film 3.

- 5 Moreover, a photodetector 8 is intended to register the light intensity of the light reflected from the test film 3. An optical lens 9 is placed between the measurement zone 4 and the photodetector 8, which lens is designed to concentrate the light beams 21 which are reflected from the test film 3 towards the photodetector 8 at an angle of reflection  $\beta$ .

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The measurement instrument is further provided with a processor 14 intended to compare the light intensity registered by the photodetector 8 with a predetermined calibration value, and to present a measurement value based on the said comparison, which measurement value represents the degree of covering of dust and dirt on the surface 30 (see Fig. 4). The measurement value is presented in a display window 22 formed in the casing 15, as can best be seen in Fig. 5. The degree of covering of dust and dirt is normally indicated as a percentage of the measurement value (100%) which is obtained on a clean surface, i.e. a surface free of dust and dirt.

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The method according to the invention is carried out in the following stages:

- 25 - in a first stage, a test film 3 coated with an adhesive layer 5 is applied with a predetermined pressure against the surface 30 whose degree of covering of dust and dirt is to be measured, with any dust and dirt particles 31 from the said surface 30 attaching themselves to the adhesive layer 5;
- 30 - the test film 3 is then removed from the said surface 30 and is placed in a holder 2 which, at least during measurement, holds the test film 3 in a plane in a measurement zone 4 defined by the measurement instrument 1,
- a light source 6 illuminates the adhesive layer 5 of the test film 3 with obliquely incident light;
- 35 - a photodetector 8 registers the light intensity of the light reflected from the test film 3; and

- 8 -

- a processor 14 compares the light intensity registered by the photodetector 8 with a predetermined calibration value, and presents a measurement value based on the said comparison, which measurement value represents the degree of covering of dust and dirt on the surface 30.

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A portable gloss meter of a known type, which measures reflected light from a surface and presents a measurement value in the form of a gloss number, can advantageously be adapted for use as a measurement instrument 1 according to the invention, by means of a holder 2 according to the above description being mounted in the measurement opening of the gloss meter. In this way, a measurement instrument is obtained which is much more compact and easier to handle compared to the known measurement instrument described above with reference to Fig. 1, and it also costs much less on account of the fact that such a gloss meter is manufactured in considerably larger batches. The invention therefore makes available an inexpensive and effective method of measuring cleaning quality, which method can be used to great advantage by cleaning companies for their own monitoring purposes, or by cleaning contractors such as schools, nurseries and hospitals.

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The invention is not limited to the illustrative embodiment described above and shown in the drawings, but can be freely modified within the scope of the attached patent claims. For example, the holder 2 can be designed as a pivotable cover or can be integrated in a protective plate which normally accompanies the gloss meter of the above-described type for the purpose of protecting the measurement opening when the instrument is not in use.

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## PATENT CLAIMS:

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1. Measurement instrument (1) for measuring the degree of covering of dust and dirt on a surface (30), for example in order to monitor cleaning quality, comprising a holder (2) by means of which a measurement object in the form of a test film (3) is held, during measurement, in a plane in a measurement zone (4) defined by the measurement instrument, the said test film (3) being coated with an adhesive layer (5) which, during testing on the surface (30), is intended to pick up any dust and dirt particles (31) from the said surface, characterized by:

15 - a light source (6) intended to illuminate the adhesive layer (5) of the test film (3) with obliquely incident light;

- a photodetector (8) intended to register the light intensity of the light reflected from the test film (3); and

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- a processor (14) intended to present a measurement value which represents the degree of covering of dust and dirt on the surface (30), the said measurement value being based on the light intensity registered by the photodetector (8).

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2. Measurement instrument (1) according to Patent Claim 1, characterized in that the said processor (14) is intended to compare the light intensity registered by the photodetector (8) with a predetermined calibration value, and to present a measurement value based on the said comparison, which measurement value represents the degree of covering of dust and dirt on the surface (30).

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3. Measurement instrument (1) according to Patent Claim 1, characterized in that the light source (6) is intended to illuminate the adhesive layer (5) of the test film (3) at an angle of incidence ( $\alpha$ ) of between 20 and 80 degrees, preferably 60 degrees.

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4. Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that, during the measurement,

- 10 -

the test film (3) is placed in the holder (2) in such a way that its adhesive layer (5) is directed towards the light source (6).

- 5      5.      Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that, during the measurement, the test film (3) is secured without tensioning in the holder (2) by means of securing members (10), in such a way that the adhesive layer (5) of the test film (3) is essentially plane.
- 10      6.      Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that an optical lens (7) is placed between the light source (6) and the measurement zone (4), which lens (7) is designed to parallelize the light beams (12) which impact the test film (3).
- 15      7.      Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that an optical lens (9) is placed between the measurement zone (4) and the photodetector (8), which lens is designed to concentrate the light beams (21) which are reflected from the test film (3) towards the photodetector (8).
- 20      8.      Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that the said predetermined calibration value corresponds to the measurement value for a test film (3) free of dust and dirt.
- 25      9.      Measurement instrument (1) according to one or more of the preceding patent claims, characterized in that the holder (2) is arranged such that it can move relative to the rest of the measurement instrument (1).
- 30      10.      Measurement instrument (1) according to Patent Claim 9, characterized in that the holder (2) is arranged such that it can be detached from the rest of the measurement instrument (1).
- 35      11.      Method for measuring the degree of covering of dust and dirt on a surface (30), for example in order to monitor cleaning quality, comprising the following stages:

- 11 -

5     - in a first stage, a test film (3) coated with an adhesive layer (5) is applied with a predetermined pressure against the surface (30) whose degree of covering of dust and dirt is to be measured, with any dust and dirt particles (31) from the said surface (30) attaching themselves to the adhesive layer (5);

10    - the test film (3) is then removed from the said surface (30) and is placed in a holder (2) which, at least during measurement, holds the test film (3) in a plane in a measurement zone (4) defined by the measurement instrument (1),

and characterized by the following stages:

15    - a light source (6) illuminates the adhesive layer (5) of the test film (3) with obliquely incident light;

      - a photodetector (8) registers the light intensity of the light reflected from the test film (3); and

20    - a processor (14) presents a measurement value which represents the degree of covering of dust and dirt on the surface (30), the said measurement value being based on the light intensity registered by the photodetector (8).

25    12. Method according to Patent Claim 11, characterized in that the said processor (14) compares the light intensity registered by the photodetector (8) with a predetermined calibration value, and presents a measurement value based on the said comparison, which measurement value represents the degree of covering of dust and dirt on the surface (30).

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      13. Method according to Patent Claim 11, characterized in that the light source (6) illuminates the adhesive layer (5) of the test film (3) at an angle of incidence ( $\alpha$ ) of between 20 and 80 degrees, preferably 60 degrees.

35    14. Method according to one or more of Patent Claims 11 to 13, characterized in that, before the measurement, the test film (3) is placed in the holder (2) in such a way that its adhesive layer (5) is directed towards the light source (6).

- 12 -

15. Method according to one or more of Patent Claims 11 to 14, characterized in that, before the measurement, the test film (3) is secured without tensioning in the holder (2), in such a way that the adhesive layer (5) of the test film (3) remains essentially plane during the measurement.

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16. Use of a gloss meter (1), of the type which measures light reflected from a surface, as a measurement instrument for measuring the degree of covering of dust and dirt on a surface (30), for example in order to monitor cleaning quality, together with a test film (3) coated with an adhesive layer

10 (5).

1/3

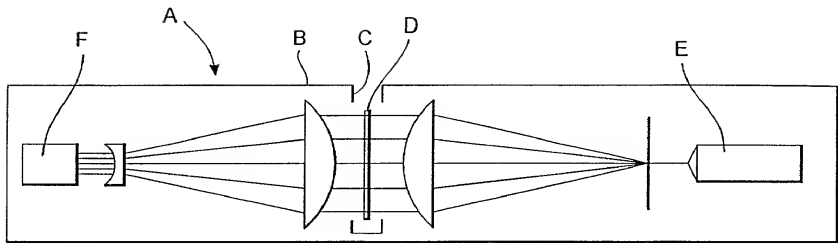


Fig.1

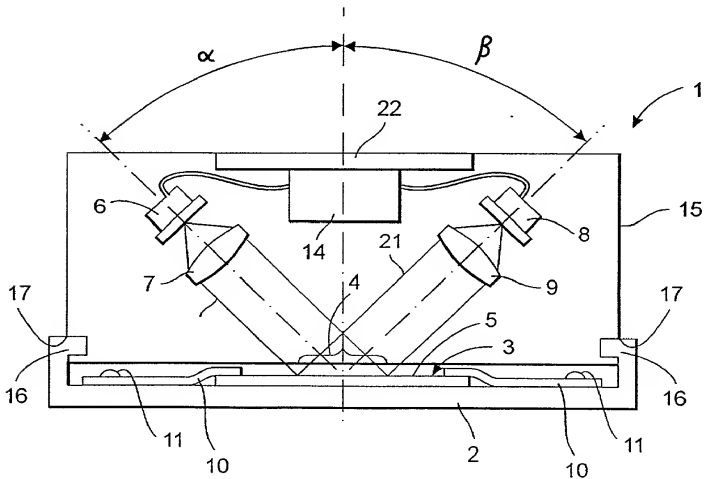


Fig.2

2/3

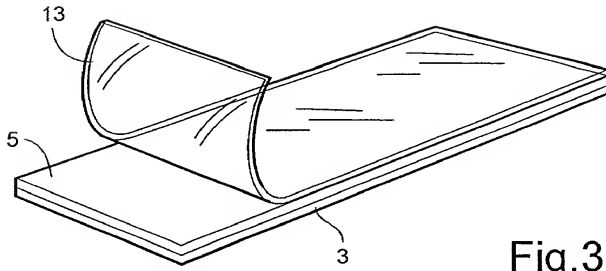


Fig. 3

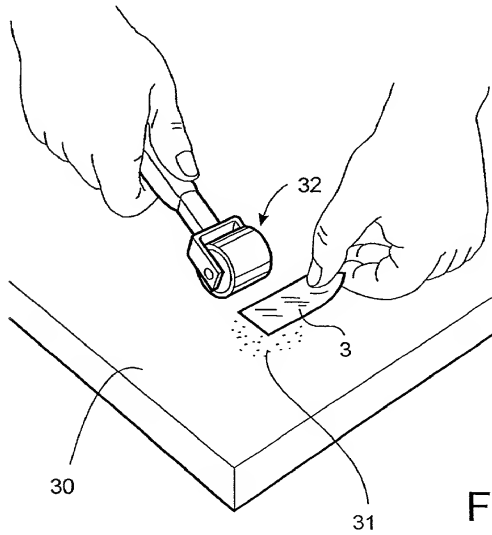


Fig. 4



3/3

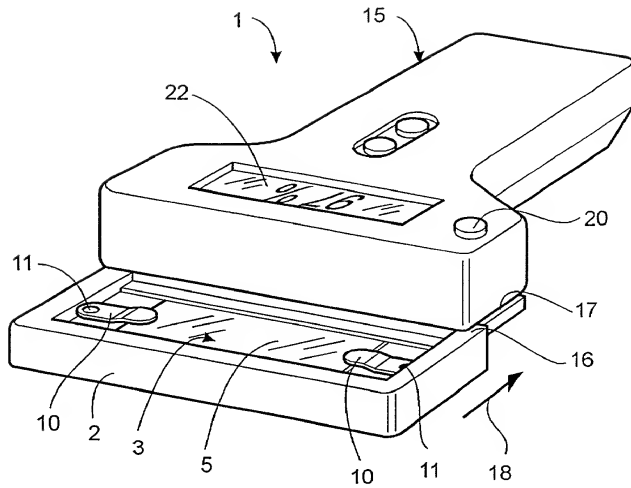


Fig.5

# DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

#3

ATTORNEY'S DOCKET NO.: ALBIHN-411

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: AN INSTRUMENT AND A METHOD FOR MEASURING THE DEGREE OF DUST AND DIRT ON A SURFACE, the specification of which

☐ is attached hereto

☒ was filed on 17 December 1999 as United States Application Number or PCT International Application Number PCT/SE99/02405 and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed:

## PRIOR FOREIGN APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING (month, day, year)	PRIORITY CLAIMED
Sweden	9804398-7	December 17, 1998	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>

LISTING OF FOREIGN APPLICATIONS CONTINUED ON PAGE 3 HEREOF ☐ YES ☒ NO

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Application Number: \_\_\_\_\_ Filing Date: \_\_\_\_\_

Application Number: \_\_\_\_\_ Filing Date: \_\_\_\_\_

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

U.S. Parent Application Serial Number: \_\_\_\_\_ Parent Filing Date: \_\_\_\_\_ Parent Patent No.: \_\_\_\_\_

U.S. Parent Application Serial Number: \_\_\_\_\_ Parent Filing Date: \_\_\_\_\_ Parent Patent No.: \_\_\_\_\_

PCT Parent Number: \_\_\_\_\_ Parent Filing Date: \_\_\_\_\_

LISTING OF US APPLICATIONS CONTINUED ON PAGE 3 HEREOF: ☐ YES ☒ NO

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

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Inventors: I. Lerner, Reg. No. 19,518; Sidney David, Reg. No. 22,788; Joseph S. Littenberg, Reg. No. 20,832; Arnold H. Krumholz, Reg. No. 25,428; William L. Mentlik, Reg. No. 27,108; John R. Nelson, Reg. No. 26,573; Roy H. Wepner, Reg. No. 28,350; Stephen B. Goldman, Reg. No. 28,512; Paul H. Kochanski, Reg. No. 29,660; Marcus J. Millet, Reg. No. 29,241; Bruce H. Sales, Reg. No. 32,793; Daniel R. Boba, Reg. No. 16,684; Keith E. Gilman, Reg. No. 32,137; Robert B. Cohen, Reg. No. 32,788; Arnold B. Dornien, Reg. No. 25,735; Michael H. Teschner, Reg. No. 32,852; Gregory S. Gewirtz, Reg. No. 36,522; Jonathan A. David, Reg. No. 36,492; Shawn P. Foley, Reg. No. 33,071; Thomas M. Pelis, Reg. No. 35,625; John P. Mardjan, Reg. No. 41,567; Jason D. Shanske, Reg. No. P-43,912; Kimberly V. Flueger, Reg. No. P-43,912; Jason I. Garball, Reg. No. P-44,167; Renee M. Robeson, Reg. No. 41,777.

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# DECLARATION -- Page 2

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name): 1-00 Ari KOUVONEN

Inventor's signature Ari Kouvonen Date June 14, 2001

Residence: SUNDBYBERG, Sweden Citizenship: Sweden SEX

Post Office Address: Odalvägen 19, S-172 44 SUNDBYBERG, Sweden

Full name of second joint inventor, if any (given name, family name): \_\_\_\_\_

Second Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of third joint inventor, if any (given name, family name): \_\_\_\_\_

Third Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of fourth joint inventor, if any (given name, family name): \_\_\_\_\_

Fourth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of fifth joint inventor (given name, family name): \_\_\_\_\_

Fifth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of sixth joint inventor, if any (given name, family name): \_\_\_\_\_

Sixth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of seventh joint inventor, if any (given name, family name): \_\_\_\_\_

Seventh Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of eighth joint inventor, if any (given name, family name): \_\_\_\_\_

Eighth Inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence: \_\_\_\_\_ Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_